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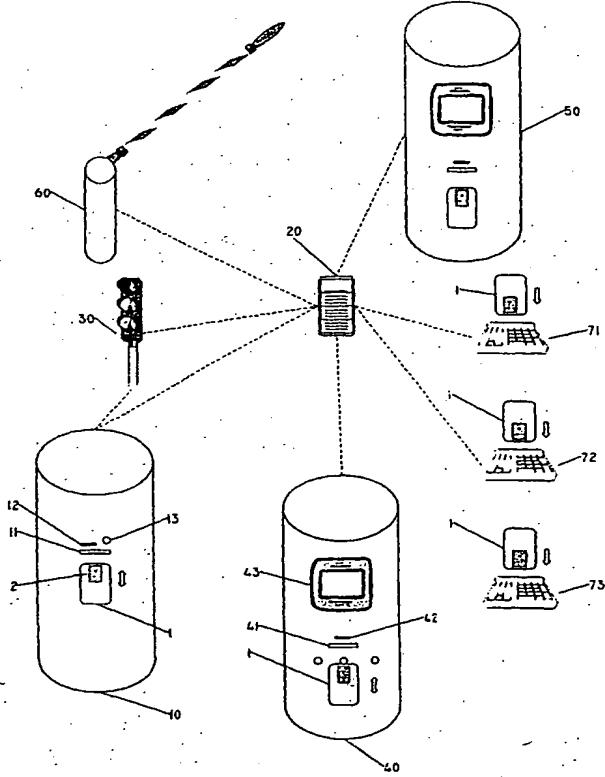
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[Continued on next page]

(54) Title: PARKING CONTROL SYSTEM FOR MANAGING A COVERED OR NON-COVERED PARKING FACILITY

(57) Abstract: Parking control system for managing a cov-  
ered or non-covered parking facility comprising access control  
means (10, 30) which work together with access means (1) for  
registering and facilitating access to the parking facility.



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**A. CLASSIFICATION OF SUBJECT MATTER**  
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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
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| X        | PATENT ABSTRACTS OF JAPAN<br>vol. 1997, no. 07,<br>31 July 1997 (1997-07-31)<br>& JP 09 073564 A (DAINIPPON PRINTING CO<br>LTD), 18 March 1997 (1997-03-18)<br>abstract                              | 1-9                   |
| X        | FR 2 770 318 A (SCHLUMBERGER IND SA)<br>30 April 1999 (1999-04-30)   | 1-4,7                 |
| A        | the whole document<br>figure 1   | 5,6,8,9               |
|          |  | -/-                   |

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Patent family members are listed in annex.

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|  |   |                  | US | 6116506 A               |  | 12-09-2000       |
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
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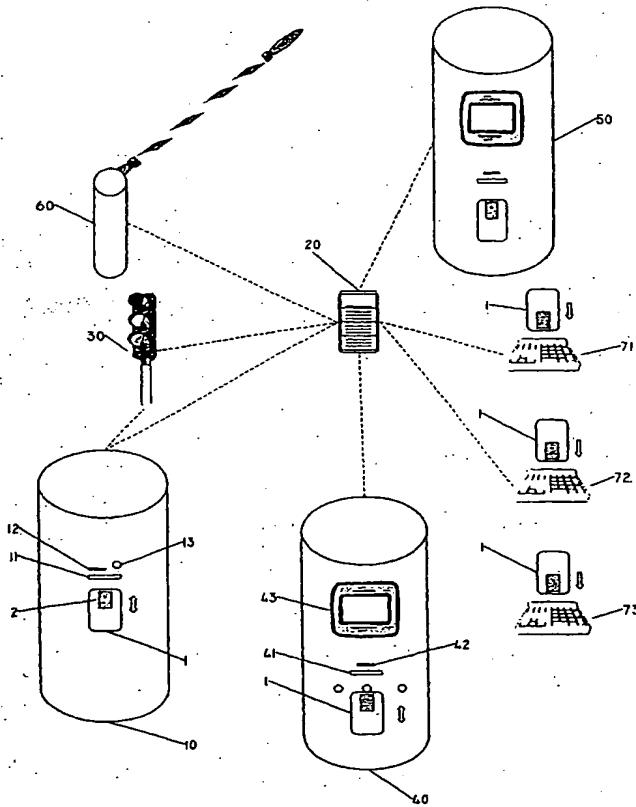
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(54) Title: PARKING CONTROL SYSTEM FOR MANAGING A COVERED OR NON-COVERED PARKING FACILITY

(57) Abstract: A parking control system for managing a covered or non-covered parking facility comprises entrance control means (10, 30) which are able to co-act with an issued access means (1) to register and optionally facilitate entry to the parking facility. Charging means and payments means (40) are further provided for associating a parking fee to a presented access means after expiry of a certain parking period and for transacting payment thereof. The payment means are coupled to data storage means (2, 20) in which a parking credit associated with the access means can be registered. A parking fee associated with the access means can be deducted from this parking credit, wherein different users of the system are able to register and top up the parking credit in the data storage means.



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**Parking control system for managing a covered or non-covered parking facility**

The present invention relates to a parking control system for managing a covered or non-covered parking facility, comprising entrance control means which are able to co-act with  
5 an issued access means to register and optionally facilitate entry to the parking facility, charging means for associating a parking fee to a presented access means; payment means for transacting and registering payment of a charged parking fee, and exit control means which are able to operate an exit barrier at an exit of the parking facility on the basis of a presented access means and the registration of payment or non-payment of a  
10 parking fee associated therewith.

Owing to the increased mobility of consumers an ever increasing need has arisen for covered or non-covered parking facilities in cities and at shopping centres. A shortage of  
15 parking space has therefore developed in many cities and municipalities, the available space often being insufficient to accommodate all vehicles. Not surprisingly, a parking fee is usually imposed, particularly by local authorities, in order to discourage the use of parking spaces and to serve as extra source of income. Charging a certain parking fee is also the rule rather than the exception in the private sector. The development of sometimes huge parking garages and specially equipped car parks requires such a large  
20 investment that charging therefor is usually unavoidable. Not only is the consumer confronted by these irritating charges, retailers are not always very happy with the levying of parking charges. Not only could this keep consumers away, it also limits the shopping time of consumers and therefore the level of consumption. Initiatives by shopping centres to absorb parking costs themselves often encounter great financial  
25 drawbacks and usually result in complicated charging systems, whereby they are generally not feasible in practice.

The present invention has for its object inter alia to provide a system for managing a covered or non-covered parking facility which is flexible such that individual retailers and shopping centres can take up the parking costs of a customer in full or in part without  
30 this requiring complicated charging systems or further overheads.

For this purpose a system for managing a covered or non-covered parking facility of the type stated in the preamble has the feature according to the invention that the payment  
35 means are at least temporarily coupled to data storage means in which a parking credit associated with the access means can be registered, that the payment means are able to deduct a parking fee associated with the access means from a parking credit registered for the access means, and that different users of the system are able to register and top up a parking credit for an access means in the data storage means. In this parking control  
40 system a parking credit can be maintained for each customer/user of the parking facility.

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This parking credit can be supplemented or built up by various users of the system. Such a user is for instance an affiliated retailer. The system provides the retailer with the option of registering a parking credit for a customer after this customer has paid for his purchase. This parking credit can for instance be made dependent on the value of the purchase. Each retailer can make his own choices in this respect. When the customer presents his access means upon returning to the parking facility, he will be charged only a reduced parking fee or even no parking fee at all. In the latter case the customer can leave the parking facility without charge. Each retailer can thus individually offer his customers a reduced parking fee or even take up the whole parking fee, so that customers are no longer kept away due to this. This will moreover quickly result in extra goodwill and good customer loyalty, so that the customer will be happy to return for a subsequent purchase.

The data storage means can be provided per se in different ways. It is thus possible to make use of a network environment in which the data storage means are connected in optionally distributed manner. The different components of the parking control system are then extended with network terminals at the individual retailers by means of which access to the data storage means is possible. A drawback hereof however is the relatively large investment required to add a user to the system and the overhead which this entails for the user. A preferred embodiment of the system according to the invention is therefore characterized in that the data storage means comprise an electronically accessible memory which is integrated into the access means. Because the data storage means are integrated into the access means themselves, interactions can take place therewith at local level. The retailer need only have a terminal which is able to exchange data with the memory on the access means. A parking credit can thus be registered in particularly simple manner, wherein an association is made automatically between parking credit and access means, which parking credit can later be read by the payment means in the parking control system.

The costs associated with this parking credit must be recovered from the retailer in question. Use can be made for this purpose of a terminal at the premises of the retailer which transmits these costs to a central administration body in instantaneous or deferred manner via a suitable telecommunication connection, or for instance a terminal which stores in the memory on the access means not only the parking credit but also the identity of the retailer offering the credit. In the latter case the parking control system according to the invention can also keep the necessary accounts when the access means is then read, so that no separate infrastructure is required for this purpose. This preferred embodiment requires the customer to carry the access means with him/her so it can be presented to a retailer. With a view hereto, this preferred embodiment further has the feature in a particular embodiment according to the invention that the access means comprise a card-

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shaped body. Use is preferably made here of a credit card-like or similar format which can be readily kept in an average purse or wallet.

In a further particular embodiment the parking control system according to the invention  
5 has the feature that a microprocessor able to co-act with the payment means is also integrated into the access means for the purpose of deducting a charged parking fee from a registered parking credit. All the electronics required to carry out transactions in the memory can thus be available in the access means themselves. Advanced authentication and encryption keys in particular can thus be integrated into the access means to prevent  
10 improper use of the system. This is especially important in a further particular embodiment of the parking control system according to the invention which is characterized in that the access means is suitable for electronic payment transactions and that a possibly remaining parking fee is paid by means of electronic payment. The microprocessor in the access means can thus be employed for the authorization and  
15 verification of a monetary transaction via electronic payment by means of which an unpaid part of the parking fee can be paid. Apart from an authorization which may still possibly have to be inputted separately by the user to allow the monetary transaction, for instance entering a PIN-code, the client need not notice anything of the whole transaction of the payment of the parking fee and the distribution of at least part thereof over one or  
20 more affiliated retailers where he or she has made a purchase. Such a manual authorization can even be dispensed with in a further embodiment of the parking control system which is characterized according to the invention in that the access means also comprise storage means for a value credit which can be accessed by the microprocessor to deduct therefrom a possibly remaining parking fee. This can for instance be an  
25 electronic purse designated as ChipKnip® or Chipper® integrated into the access means or serving as access means.

In a further preferred embodiment the parking control system according to the invention  
30 is characterized in that the charging means and payment means and exit control means are combined in a joint housing which also comprises means for electronic interaction with a presented access means. Owing to the integration of said components of the system in a joint, for instance pillar-like housing, an exceptionally compact whole is achieved which can be employed as such in stand-alone manner, or can be coupled to the existing infrastructure of a parking facility which already provides the different basic  
35 functions but which lacks the above described functionality specifically relating to an optionally amassed parking credit. With a view to the latter, a further particular embodiment of a parking control system according to the invention is characterized in that the exit control means comprise a signal output by means of which a defined control signal is provided to the exit barrier. The output signal can herein be adapted to the standard I/O control signal of the existing exit barrier in the parking facility, so that the  
40

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system according to the invention can be applied wholly in parallel with an existing installation.

In a further preferred embodiment the parking control system according to the invention  
5 is characterized in that display means are also provided in order to provide, on the basis  
of the presented access means, an indication of the users of the system who have  
registered or topped up a parking credit for the presented access means. During for  
instance payment of the parking fee or during driving out of the parking facility it is thus  
possible to communicate to the customer who has at least partly paid the parking fee for  
10 him. In this manner extra goodwill and customer loyalty can be generated without the  
retailer having to state each time that he will pay at least part of the parking fee.

The invention will now be further elucidated with reference to a specific embodiment  
and an associated drawing. In the drawing:

15 figure 1 shows a schematic representation of a parking control system according to  
an embodiment of the present invention.

The figure is herein drawn purely schematically and not to scale. Some dimensions in  
particular are greatly exaggerated for the sake of clarity.

20 The parking control system of figure 1 comprises entrance control means 10 in the form  
of a stylized pillar which is provided with a card reader 11 for a chip card 1 presented  
thereto. The chip card is a handy card-shaped body, normally of durable plastic, in which  
is arranged an integrated circuit 2. In addition to a microprocessor, the circuit comprises  
an electronically writable and readable memory in which a limited amount of data can be  
25 stored keyed or unkeyed. Access to this data takes place via contact pads provided for  
this purpose on the surface of the circuit which co-act with corresponding contact means  
in card reader 11. The chip card is personalized and can be supplied to customers who  
register their personal details at issuing points equipped for this purpose. Chip card 1  
serves as access means to the parking facility behind pillar 10 and the time is written to  
30 card 1 via card reader 11. In addition to a card reader, entry means 10 also comprise in  
this embodiment ejecting means 12 for a conventional access means in the form of a  
ticket or the like for once-only use provided with a magnetic strip, bar code or other  
electronically and reliably readable registration of the commencement of the parking  
time. By pressing a button 13 provided for this purpose such an access means can be  
35 issued to those who do not have a chip card. The system is hereby fully compatible with  
existing parking control systems.

Entrance pillar 10 is coupled to a central computer system 20 which keeps track of  
matters such as the degree of occupation of the parking facility, on the basis of which  
40 signals can be sent to the entrance of the parking facility. In addition, computer system 20

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ensures total control of the system. A choice can be made as such to also store a copy of the relevant data from card 1 in computer system 20 at entry into the parking facility, so that this data can be retrieved in the case of loss or theft. For this purpose the central computer system has data storage means in the form of one or more magnetic disk drives which are connected in a data network in optionally distributed manner. A total database of all parking tickets issued by entry means 10 can also be maintained herein, so that within the system according to the invention a functionality can be offered thereto comparable to that offered to the personalized chip cards 1.

After the commencement time has been registered by means of entry means 10, a control signal is generated to an entrance barrier, whereupon the customer/user can drive into the parking facility and then secure a parking space. The entrance barrier can be a physical barrier, such as for instance a bar gate, but it is also possible to suffice per se with a traffic light 30 which only indicates whether or not it is allowed to drive into the parking facility, as shown here. When the parking facility is fully occupied, this traffic light is controlled by central computer system 20 as well as from entrance pillar 10 to block entry until a space becomes available again.

The customer can then make his purchases. If he opts herein for a retailer/user affiliated with the system, the access means 1 can be inserted into a terminal 71..73 provided for this purpose at the retailer during payment for the purchases. On the basis of a formula preset by the retailer a parking credit is now written to chip card 1 or, if such a credit was not yet available, a parking credit is created. The retailer can choose to take up the full parking costs when a determined purchase sum threshold has been exceeded, or for instance to offer in each case a proportional part of the purchase sum as parking credit. This parking credit is then (further) supplemented at other affiliated retailers, for instance in the same shopping centre, where the customer makes purchases. All retailers can herein operate their own charging system independently of each other, geared for instance to their specific activity. In the case of a chip card 1, these operations can be performed in wholly stand-alone manner in terminal 73. In addition to the parking credit, an encrypted or non-encrypted designation of the contributing retailer is also written to the memory of the chip card for later administrative processing in the system. It is possible instead to opt for terminals 71,72 coupled to the central computer system via a telecommunication connection, shown here schematically with a dotted line. The parking credit can then be entered directly in the central computer system so that a parking ticket/access means without its own data storage means can also be applied.

When returning to the parking facility, the customer can present his access means 1 to charging means and payment means provided for this purpose, which are accommodated together in a joint pillar-like housing 40. These means comprise a card reader 41 for a

chip card 1 as well as input means 42 for a conventional entrance ticket issued by the entry means. As soon as the access means has been inserted the total parking duration is calculated and the current parking fee is associated therewith. In the first instance this parking fee is deducted by the payment means from a parking credit registered in relation 5 to the access means in question. In the case of a chip card 1 this credit can be read from the memory of the card; in the case of a conventional access means a possible parking credit is retrieved via the central computer system. In the case of a sufficient parking credit the access means is cleared in the system; when credit is insufficient an additional payment must be made. This can be done with cash, credit card or, as in this case, from 10 an electronic purse or other means of electronic payment also integrated on the chip card. Pillar 40 has a display screen 43 which provides, in addition to checking information, an indication of the contributing retailer(s) who is/are (partly) paying the parking fee. Central computer system 20 provides at least a part of the further administrative transaction, wherein the paid out parking credit is charged to the retailers in question. 15 This is however wholly concealed from the customer who has been able to use the parking facility at a reduced fee or even free of cost.

In order to leave the parking facility, the customer presents the thus cleared access means to exit control means 50 provided for this purpose. A display screen 53 is also 20 incorporated herein to optionally provide another indication or message from the retailers who have at least partly taken up the parking fee. In the case of a conventional entrance ticket, the access means is here taken in and a possibly remaining parking credit erased in the central computer system; in the case of a chip card the access means is returned and a remaining parking credit is retained. At an output of the exit control means a defined I/O 25 signal then appears which is transmitted as such to an exit barrier 60 in order to release the exit of the parking facility.

The system shown here hereby provides a total solution for a parking facility, but can 30 optionally also be applied in combination with an existing installation. In the latter case the different components of the system are placed in parallel to the corresponding components of the existing installation. The output signals of the different components of the system according to the invention can be adjusted to the standard of the existing installation in order to link up smoothly therewith. Components such as the central 35 computer system can herein optionally be shared. The invention thus provides a parking control system which can be employed in particularly flexible manner, and which gives each retailer a free choice of participation therein or of the degree and mode in which he participates.

Although the invention has been further elucidated above on the basis of only a single 40 embodiment, it will be apparent that the invention is by no means limited to the given

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embodiment. On the contrary, many more variations and embodiments are possible for the person with ordinary skill in the art within the scope of the invention. Instead of a card-shaped body, a differently formed body can thus also be used as access means. It is also possible herein to make use of for instance a magnetic strip as data storage means integrated into the access means itself. The parking control system according to the invention can also be combined with other loyalty programs of the same or other retailers, wherein the customer is offered benefits, products or services in order to improve customer loyalty.

**Claims**

1. Parking control system for managing a covered or non-covered parking facility, comprising entrance control means which are able to co-act with an issued access means to register and optionally facilitate entry to the parking facility, charging means for associating a parking fee to a presented access means; payment means for transacting and registering payment of a charged parking fee, and exit control means which are able to operate an exit barrier at an exit of the parking facility on the basis of a presented access means and the registration of payment or non-payment of a parking fee associated therewith, characterized in that the payment means are at least temporarily coupled to data storage means in which a parking credit associated with the access means can be registered, that the payment means are able to deduct a parking fee associated with the access means from a parking credit registered for the access means, and that different users of the system are able to register and top up a parking credit for an access means in the data storage means.
2. Parking control system as claimed in claim 1, characterized in that the data storage means comprise an electronically accessible memory which is integrated into the access means.
3. Parking control system as claimed in claim 2, characterized in that the access means comprise a card-shaped body.
4. Parking control system as claimed in claim 2 or 3, characterized in that a microprocessor able to co-act with the payment means is also integrated into the access means for the purpose of deducting a charged parking fee from a registered parking credit.
5. Parking control system as claimed in any of the foregoing claims, characterized in that the access means is suitable for electronic payment transactions and that a possibly remaining parking fee is paid by means of electronic payment.
6. Parking control system as claimed in claims 4 and 5, characterized in that the access means also comprise storage means for a value credit which can be accessed by the microprocessor to deduct therefrom a possibly remaining parking fee.
7. Parking control system as claimed in any of the foregoing claims, characterized in that the charging means and payment means and exit control means are combined in a joint housing which also comprises means for electronic interaction with a presented access means.

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8. Parking control system as claimed in any of the foregoing claims, characterized in that the exit control means comprise a signal output by means of which a defined control signal is provided to the exit barrier.

5 9. Parking control system as claimed in any of the foregoing claims, characterized in that display means are also provided in order to provide, on the basis of a presented access means, an indication of the users of the system who have registered or topped up a parking credit for the presented access means.

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